

Public Meeting to Discuss the Feasibility of Providing Shore-Based Electrical Power to Vessels while Docked



November 9, 2004

California Environmental Protection Agency



Air Resources Board

Meeting Overview

- ARB's Plan to Evaluate Shore Power Feasibility
- Vessel Activity at California Ports
- Description of Shore Power Systems
- Energy Supply and Infrastructure Needs
- Perspectives on Shore Power
- Presentations by Others
- Next Steps

Shore Power to Reduce Hotelling Emissions

- While docked, ocean-going vessels use diesel engines to provide electrical power for refrigeration, lights, pumps, etc. (hotelling emissions)
- “Shore powering” is the process of providing electrical power to the vessel, allowing for the shut-down of on-board diesel engines that provide hotelling power
- “Shore powering” does not include the shutting down of on-board boilers

What are the Objectives of the Feasibility Study

- Assess the technical feasibility of shore power at California's ports for ocean-going vessels
- Estimate the costs to modify both vessels and ports to facilitate shore power
- Estimate the shore power energy requirements at each port
- Evaluate the cost-effectiveness of shore power
- Provide a recommendation on the viability of shore power as an emission control strategy

Schedule

- First Draft of Feasibility Study Report
 - February 2005
- Public Meeting
 - March 2005
- Final Report Released
 - April 2005

Why Conduct a Shore Power Feasibility Study



Future Trends

- Dramatic increase in trade
- More emissions from entire goods movement system
- Concentrated near population centers
- Some sources still poorly controlled

Public Health Is Imperative

- Will prevent attainment if not addressed
- Localized exposure and risk a significant concern



California's Framework for Air Quality Improvement

- **Diesel Risk Reduction Plan**
 - Adopted in 2000
 - 75% reduction in diesel PM by 2010
 - 85% reduction in diesel PM by 2020
- **Governor's Environmental Action Plan**
 - Calls for 50% reduction in air pollutant emissions by 2010
- **State Implementation Plan**
 - Blueprint for meeting federal air quality standards for ozone and PM

SIP Requirement- Reduce Emissions from Existing Oceangoing Ships: Auxiliary Engines

- **Cold-ironing for ships that frequently visit South Coast ports**
 - Evaluate 2004
 - Adoption 2005 (pending evaluation)
- **Reduce emissions from auxiliary engines on ships while hotelling**
 - Evaluate 2004
 - Adopt by 2006

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Vessel Activity at California Ports



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Overview

- Vessel Inventory Data
- Potential Peak Power and Energy Demands
 - Activity Assumptions
- Next Steps

Sources of Vessel Inventory Data

- California State Lands Commission
- Marine Exchange of Los Angeles and Long Beach

Types of Data

- Vessel name
- Type of Vessel
 - Bulk
 - Container
 - Tanker
 - Passenger
 - Reefer
- Port Visited
- Duration of Visit (POLA and POLB)

Vessels that have visited California 10 or more times per year

Vessels that Visit One Port Ten or More Times a Year				
Port	Vessel Visits	% of Total Vessel Visits	Vessels	% of Total Vessels
LA-LB	2028	39%	117	11%
Oakland	786	44%	64	22%
San Francisco	48	26%	3	5%
San Diego	206	50%	10	12%
Hueneme	64	20%	4	4%
Richmond	246	49%	10	10%
Carquinez	118	24%	9	6%
Stockton	20	13%	1	2%
El Segundo	120	64%	4	14%
Conoco-Phillips	none	n/a	none	n/a
Humbolt	none	n/a	none	n/a
Redwood	none	n/a	none	n/a
Sacramento	none	n/a	none	n/a
Total	3636		222	

Vessels that Visit California Ports Ten or More Times a Year				
Port	Vessel Visits	% of Total Vessel Visits	Vessels	% of Total Vessels
LA-LB	2902	55%	297	28%
Oakland	1474	83%	185	64%
San Francisco	88	47%	18	31%
San Diego	260	63%	25	30%
Hueneme	108	34%	16	16%
Richmond	362	73%	44	43%
Carquinez	282	56%	51	36%
Stockton	34	22%	7	12%
El Segundo	162	86%	20	71%
Conoco-Phillips	none	0%	none	0%
Humbolt	20	63%	6	50%
Redwood	14	33%	3	18%
Sacramento	22	42%	9	50%
Total	5738		683	

Potential Peak Power and Energy Demands from Shore Powering

- Sources of Data
 - California State Lands Commission
 - Marine Exchange of Los Angeles and Long Beach
 - POLB Study
 - Cold Ironing Cost Effectiveness Port Long Beach, 2004 (Environ)
 - POLA Study
 - Port of Los Angeles 2001 Baseline Emission Inventory, 2004 (Starcrest)
 - Marine Vessel Emissions Inventory and Control Strategies, 1999 (Arcadis)

Potential Maximum Energy Demand and Energy Usage from Shore Powering

Port Name	Vessel	Number of	Total Avg.	Max. Potential	Load	Avg. Aux. Power	Hotelling	Max. Energy
	Type	Vessel Visits	Aux. Power	Aux. Power	Factor	by Vessel Type	Time	Usage
		in Max. Day	(kW)	(mW)		(mW-hr)	(hrs)	(mW/day)
Los Angeles	Bulk	2	1,169	2.34	0.22	0.51	24	12.34
(max. day)	Reeler	1	1,300	1.30	0.34	0.44	24	10.61
6/19/04	Tanker	3	1,985	5.96	0.67	3.99	24	95.76
	Container	7	5,746	40.22	0.17	6.84	24	164.11
Total		13		49.82		11.78		282.81

Estimated Maximum Energy Demand from Shore Powering

Port Name	Max. Potential Aux. Power (mW)
Los Angeles	50
Long Beach	91
Oakland	56
San Francisco	29
San Diego	27
Hueneme	18
Richmond	10
Carquinez	10
Stockton	4
El Segundo	4
Humbolt	6
Redwood	2
Sacramento	2
Total	309

Next Steps

- ARB Survey
- Data Analysis
 - Inventory
 - Emission Factors
 - Cost
 - Cost Effectiveness

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